REMARKS

The claims have been amended to more clearly define the invention as disclosed in the written description. In particular, new claim 25 has been added and claims additional features of the invention. In addition, new claims 26-28 present the limitations of original claims 2, 20 and 21. In addition, the claims have been amended for clarity.

Enclosed herewith is form PTO/SB/08a listing the articles cited in the International Search Report and cited in the specification of the subject application. Also enclosed herewith are copies of the articles.

The Examiner has rejected claims 1, 3-19 and 22-24 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,890,125 to Davis et al. in view of European Patent Application No. EP0466037 to Brandenburg et al. Applicants acknowledge that the Examiner has found claims 2, 20 and 21 allowable over the prior art of record.

The Davis et al. patent discloses a method and apparatus for encoding and decoding multiple audio channels at low bit rates using adaptive selection of encoding method, including several subband signal generators, a composite signal generator and a spatial coder connected between the subband signal generators and the formatter as can be seen, for example, in Fig. 1 or Fig. 2. Regarding the spatial characteristics, please refer to col. 8, line 38 to col. 9, line 2. The type I spatial characteristic is "some measure of signal level for each channel subband signal", while a

type II signal represents one or more apparent directions for the sound field in a subband. The subband signal generators can be constructed as outlined in col. 6, lines 53-65, where, specifically, only the subband signal generator 70 in Fig. 2, which generates the subbands of the transmitted downmix signal is disclosed to be optimized with respect to data compression "by providing critical sampling and by balancing a trade of between spectral resolution and temporal resolution", as it is outlined in col. 7, lines 5-8.

The Brandenburg et al. patent discloses hybrid perceptual audio coding.

With reference to the downsampling step ass claimed in, for example, claim 1, the Examiner points to col. 6, lines 53-65 of Davis et al., i.e., the passage discussed above. Applicants submit, however, that this passage does not disclose any downsampling operation. Although this passage states that one could use a QMF, the term "QMF" does not necessarily mean a "QMF with downsampling". Such a QMF with downsampling is called a "downsampled QMF", but the term "QMF" does not necessarily imply a downsampling operation.

Furthermore, Davis et al. clearly distinguishes between the subband signal generators 10, 20, 30 for the calculation of the spatial parameters, and a subband signal generator 70 for generating the subband signals of the downmix channel itself. Only the latter is said to be "critically sampled", which necessarily implies that, in contrast to the Examiner's statements, Davis et

al. discloses non-downsampled filter banks for the spatial synthesis and a downsampled filter bank, i.e., a critically sampled filter bank only for the filter bank used for generating the downmix subband signals.

However, claim 1 clearly states that the downsampled subband signals are subsequently used for deriving spatial parameters either directly or after the step of a further subband filtering. Therefore, the Examiner's statements in the first paragraph of page 4 of the Office Action are not supported by Davis et al.

Since Davis et al. only discloses deriving spatial parameters from subband signals rather than downsampled subband signals, the Examiner's remarks in the second paragraph of page 4 or the Office Action, related to the deriving step are not correct as well.

The Examiner correctly states that Davis et al. does not disclose the step of further subband filtering and the step of deriving spatial parameters from the sub-subband signals.

As outlined before, however, Davis et al. also does not disclose the step of downsampling the subband signals which are eventually used for deriving the spatial parameters.

The Examiner then looks to Brandenburg et al. as disclosing a method/encoder for deriving subband signals wherein subband signals are further subband filtered in a further filterbank in order to provide a plurality of sub-subband signals (see Fig. 2 and page 3, lines 29-49).

Applicants submit, however, that Fig. 2 of Brandenburg et al. illustrates a hybrid approach, where, in a first stage, a QMF filtering using elements 201, 202, 203 is performed and where, in a subsequent stage, a windowed transform for each filter bank output channel is performed. Therefore, Brandenburg et al. does not disclose the step of further subband filtering, in which a number of downsampled subband signals subjected to the further subband filtering is smaller than a total number of downsampled subband signals so that the downsampled subband signals that are not further subband filtered remain. Instead, Brandenburg et al. merely discloses to further transform each subband signal from the first filter bank, i.e., the filter bank consisting of elements 201, 202, 203.

Furthermore, Brandenburg et al. also does not disclose that the output of the QMF elements 201, 202, 203 is downsampled. This is supported by page 3, line 41, where it is specifically outlined that this "first transform" is "not critically sampled".

Brandenburg et al. only discloses that the second transform is critically sampled as outlined on page 3, line 48, but this critical sampling is not obtained by any generation of a subband signal in the downsampling operation, but by the MDCT approach, which is, by itself, critically sampled due to the inherent transform algorithm. But, the MDCT is not disclosed for the first filter bank, but is only disclosed for the second filter bank which would correspond to our "further subband filtering".

Since Davis et al. and Brandenburg et al. do NOT disclose that the subband filtering, i.e., the first stage, is critically sampled or, generally stated, is followed by a downsampling operation, and since both references do not disclose the further subband filtering step, where the number of downsampled subband signals subjected to the further subband filtering is smaller than a total number of downsampled subband signals so that the downsampled subband signals which are not further subband filtered remain, even a combination of both references will not result in the inventive method of claim 1.

The Examiner outlines that the motivation for combining both references is to provide a computational efficient filter bank with high frequency resolution. Based on such a motivation, however, those skilled in the art would not combine Brandenburg et al. and Davis et al. in such a way that only a portion of all bands within the subband signal generator is subjected to a further filtering, but the only justified combination of these references which is not based on hindsight is that those skilled in the art either replace the whole subband filter bank in a subband signal generator of Davis et al. by the whole subband filter bank of Fig. 2 of Brandenburg et al. or do not combine the references.

Such a combination of these references, however, will not result in the downsampling feature, on the one hand, and the specific newly introduced feature in the fourth paragraph of claim 1, on the other hand.

Hence, based on this motivation for combining these references, those skilled in the art would replace, if they would combine these references at all, the complete filter bank, since only a full replacement of the whole filter bank will provide a more computationally efficient filter bank design with high frequency resolution. Note that Brandenburg et al. also has a varying resolution which is higher in the lower bands compared to the higher bands, but this varying resolution is obtained by performing - in the term of claim 1 - a further subband filtering for each subband signal rather than only a portion of all subband signals.

In view of the above, Applicants believe that the subject invention, as claimed, is not rendered obvious by the prior art, either individually or collectively, and as such, is patentable thereover.

Applicants believe that this application, containing claims 1-28, is now in condition for allowance and such action is respectfully requested.

Respectfully submitted,

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